

In the Claims:

1. (Currently Amended) A method for repairing a defect in a photolithographic mask for semiconductor patterning, the photolithographic mask having a substrate or first layer of a first material with a first thickness and a first light transmittance and a second layer of a second material having a second light transmittance differing from the first, the second layer being removable in at least one pre-selected region to form a pattern, the second layer, when intact, causing a selected phase shift in light waves that pass through it relative to light passing through the first layer or substrate alone, and, when absent in a region not a subset of the pattern, constituting the defect, the method for repairing said defect comprising the steps of:

identifying the location of the defect;

modifying said first thickness of said substrate or first layer in an area that includes said defect to a selected second thickness to introduce a pre-selected phase change in said area that includes the defect location; and

depositing a repair material different than said first layer and having a pre-selected preselected index of refraction to a selected thickness over said modified area of said first layer such that light passing through said deposited material having said selected thickness and said second modified-thickness of said first layer has a phase shift substantially equal to said selected phase shift.

2. (Canceled)

3. (Previously Presented) The method according to claim 1, wherein the step of modifying the thickness of the first layer comprises reducing said thickness.

4. (Previously Presented) The method according to claim 1, wherein the step of modifying the thickness of the first layer comprises causing an increase in thickness by applying a material of known transmittivity.
5. (Previously Presented) The method according to claim 4, wherein the applied material of known transmittivity comprises more than one layer, each being of a material having known transmittivity.
6. (Currently Amended) The method according to claim 1, comprising the further step, prior to modifying the thickness of the first layer, ~~[[of]]~~ and removing a portion of the second layer adjacent the defect to create a repair zone.
7. (Previously Presented) The method according to claim 6, wherein the removal of the portion of the second layer adjacent the defect to create the repair zone comprises removing a portion of the second layer having regular geometry.
8. (Original) The method according to claim 7, wherein the regular geometry comprises at least one rectangle.
9. (Previously Presented) The method according to claim 7, wherein the regular geometry comprises at least one curvilinearly shaped portion.
10. (Previously Presented) The method according to claim 1, wherein the step of depositing a material comprises depositing a material having a pre-selected transmittance.

11.-12. (Canceled)

13. (Previously Presented) The method according to claim 3, wherein the reduction in thickness of the first layer comprises a lacuna in the first layer and wherein the deposited material fills the lacuna to a depth having an average value substantially equal to a pre-selected value.

14. (Previously Presented) The method according to claim 1, wherein the selected thickness of the deposited material is a function of at least one physical characteristic of the deposited material.

15. (Previously Presented) The method according to claim 13, wherein the selected thickness of the deposited material is a function of at least one physical characteristic of the material of the first layer.

16. (Previously Presented) The method according to claim 13, wherein the selected thickness of the deposited material is a function of at least one physical characteristic of the material to be deposited and an at least one physical characteristic of the material of the first layer.

17. (Original) The method according to claim 13, wherein the transmittance and index of refraction of the deposited material and the depth of the lacuna are selected so that light of a known intensity and phase passing through the repair zone following deposition of the material will have a pre-selected intensity, and a pre-selected phase angle relative to a reference phase angle, upon emerging from the photolithographic mask.

18. (Previously Presented) The method according to claim 1, wherein the pre-selected phase of the light emerging from the photolithographic mask is at a phase angle of substantially 180 degrees relative to the light incident on the photolithographic mask.

19.-31. (Canceled)

32. (Currently Amended) A method for patterning a wafer for use in a semiconductor circuit, the method comprising the steps of:

providing a photolithographic mask for producing a pattern on the wafer, said photolithographic mask having a first substrate or layer of a first material with a first thickness and a first light transmittance and a second layer of a second material having a second light transmittance differing from the first, the second layer being removable in selected areas to form a pattern and wherein an intact second layer causes a selected phase shift with respect to light passing through the first layer alone;

identifying a defect in the photolithographic mask and the location of the defect on the mask;

modifying said first thickness of said substrate or first layer in an area that includes said defect to a selected second thickness to introduce a pre-selected phase change in said area that includes the location of the defect;

depositing a repair material different than said first layer and having a pre-selected preselected index of refraction to a selected thickness over said modified area of said first layer such that light passing through said deposited material having said selected thickness and said modified thickness of said first layer has a phase shift substantially equal to said

selected phase; and

transmitting light through the photolithographic mask to the wafer to pattern the wafer.

33.-34. (Canceled)

35. (Original) The method according to claim 32, wherein the first light transmitting layer comprises a substantially transparent substrate layer.

36. (Original) The method according to claim 35, wherein the second light transmitting layer comprises an attenuator layer having substantially lower light transmittivity than the substrate layer.

37.-38. (Canceled)

39. (Previously Presented) The method according to claim 32, wherein the modification of the thickness of the substrate layer comprises a reduction in thickness of the substrate layer.

40. (Previously Presented) The method according to claim 39, wherein the degree of the reduction in thickness of the substrate layer is pre-selected as a function of the light transmission characteristic of the repair material.

41. (Canceled)

42. (Original) The method according to claim 32, further comprising the step, prior to the step of introducing a pre-selected phase change, of preparing a repair zone substantially at the location of the defect.

